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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/887,583 | 06/21/2001 | Raffi Codilian | K35A0824 | 8315 |

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EXAMINER

YANCHUS III, PAUL B

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2116

DATE MAILED: 07/27/2004

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/887,583

Applicant(s)

CODILIAN ET AL.

Examiner

Paul B Yanchus

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,6-8,10,12-14,16,18-20,22,24-26,28,30-32,34 and 36 is/are rejected.
- 7) ☒ Claim(s) 3, 5, 9, 11, 15, 17, 21, 23, 27, 29, 33 and 35 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 6/21/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

Oath/Declaration

The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing address of each inventor. A mailing address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing address should include the ZIP Code designation. The mailing address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

Allowable Subject Matter

Claims 3, 5, 9, 11, 15, 17, 21, 23, 27, 29, 33 and 35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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Claims 1, 2, 4, 6-8, 10, 12-14, 16, 18-20, 22, 24-26, 28, 30-32, 34 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Dougliis et al., US Patent no. 5,493,670 [Dougliis].

Regarding claim 1, Dougliis teaches a method for operating a disk drive in a mobile device [laptop] wherein, immediately after responding to a disk access command, the disk drive is in a first operating mode that consumes a relatively high level of power [spinning the disk up] and may transition to a second operating mode that consumes a relatively low level of power [spinning the disk down, column 5, line 58 – column 6, line 10], the method comprising the steps of:

setting first and second time period thresholds, the first time period threshold being less than the second time period threshold [threshold adjustment, column 10, lines 6-35];

providing an adjustable delay time interval that is set to correspond to one of the time period thresholds, the delay time interval being the time interval for waiting after an end of a response to a disk access command before transitioning from the first operating mode to the second operating mode [threshold value of inactivity, which when exceeded, determines when the disk should be spun down, column 10, lines 2-6];

measuring a demand time interval for each of a plurality of disk access commands, wherein each demand time interval [time since last access, I] is defined as a time period between an end of a response to a last disk access command and an arrival of a next disk access command [column 12, lines 1-10];

setting the delay time interval to be equal to about the first time period threshold if a majority of a predetermined number of the plurality of demand time intervals falls within a time

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period less than the first time period threshold or a time period greater than the second time period threshold [when spin up is acceptable, not increasing threshold, column 10, lines 20-22];

setting the delay time interval to be equal to about the second time period threshold if a majority of a predetermined number of the plurality of demand time intervals falls within a time period between the first time period threshold and the second time period threshold [increasing threshold when undesirable spin up occurs, column 10, lines 15-19]; and

transitioning the disk drive from the first operating mode to the second operating mode after expiration of the delay time interval [column 10, lines 2-6].

Douglis teaches a method for adaptively changing the disk inactivity time threshold for spinning down a hard disk according to past hard disk access intervals in order to avoid the occurrence of undesirable spin ups. Undesirable spin ups occur when the disk is spun up too soon after it is spun down, which means that the disk inactivity time threshold is too small. Douglis teaches setting the disk inactivity time threshold to a first value and spinning down the hard disk after the disk inactivity time threshold occurs. Douglis then teaches determining if an undesirable disk spin up occurs after the hard disk is spun down. If so, the disk inactivity time threshold is increased by a predetermined amount to a second threshold value which is larger the first threshold value and the process is repeated [column 10, lines 2-53].

Regarding claim 2, Douglis teaches that transitioning from the spinning up the disk consumes a transition quantity of power, and an exchange time interval [Td] is defined as a time period during which power consumed by continuously spinning the disk is about equal to the transition quantity of power [column, 6, lines 10-21].

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Regarding claim 4, Dougli teaches that the disk should be spun down and then spun up again if the next disk access time is greater than the exchange time interval. Therefore, Dougli teaches that any disk inactivity time threshold should be less than the exchange time interval.

Regarding claim 6, Dougli teaches checking for an undesirable disk spin up on the previous disk access to determine whether the threshold needs to be changed [column, 10, lines 7-20].

Regarding claim 7, Dougli teaches a method for operating a disk drive in a mobile device [laptop] wherein, immediately after responding to a disk access command, the disk drive is in a first operating mode that consumes a relatively high level of power [spinning the disk up] and may transition to a second operating mode that consumes a relatively low level of power [spinning the disk down, column 5, line 58 – column 6, line 10], the method comprising the steps of:

setting first, second and third time period thresholds, the first time period threshold being less than the second time period threshold and the second time period threshold being less than the third time period threshold [threshold adjustment, column 10, lines 6-35];

providing an adjustable delay time interval that is set to correspond to one of the time period thresholds, the delay time interval being the time interval for waiting after an end of a response to a disk access command before transitioning from the first operating mode to the second operating mode [threshold value of inactivity, which when exceeded, determines when the disk should be spun down, column 10, lines 2-6];

measuring a demand time interval for each of a plurality of disk access commands,

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wherein each demand time interval [time since last access, I] is defined as a time period between an end of a response to a last disk access command and an arrival of a next disk access command [column 12, lines 1-10];

setting the delay time interval to be equal to about the first time period threshold if a majority of a predetermined number of the plurality of demand time intervals falls within a time period less than the first time period threshold or a time period greater than the third time period threshold [increasing threshold when undesirable spin up occurs, column 10, lines 15-19];

setting the delay time interval to be equal to about the second time period threshold if a majority of a predetermined number of the plurality of demand time intervals falls within a time period between the first time period threshold and the second time period threshold [increasing threshold when undesirable spin up occurs, column 10, lines 15-19];

setting the delay time interval to be equal to about the third time period threshold if a majority of a predetermined number of the plurality of demand time intervals falls within a time period between the second time period threshold and the third time period threshold [increasing threshold when undesirable spin up occurs, column 10, lines 15-19]; and

transitioning the disk drive from the first operating mode to the second operating mode after expiration of the delay time interval [column 10, lines 2-6].

Douglis teaches a method for adaptively changing the disk inactivity time threshold for spinning down a hard disk according to past hard disk access intervals in order to avoid the occurrence of undesirable spin ups. Undesirable spin ups occur when the disk is spun up too soon after it is spun down, which means that the disk inactivity time threshold is too small. Douglis teaches setting the disk inactivity time threshold to a first value and spinning down the

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hard disk after the disk inactivity time threshold occurs. Dougkis then teaches determining if an undesirable disk spin up occurs after the hard disk is spun down. If so, the disk inactivity time threshold is increased by a predetermined amount to a second threshold value, which is larger than the first threshold value and the process is repeated. If an undesirable disk spin up occurs again, the disk inactivity time threshold is again increased by a predetermined amount to a third threshold value, which is larger than the second threshold value [column 10, lines 2-53].

Regarding claim 8, Dougkis teaches that transitioning from the spinning up the disk consumes a transition quantity of power, and an exchange time interval $[T_d]$ is defined as a time period during which power consumed by continuously spinning the disk is about equal to the transition quantity of power [column, 6, lines 10-21].

Regarding claim 10, Dougkis teaches that the disk should be spun down and then spun up again if the next disk access time is greater than the exchange time interval. Therefore, Dougkis teaches that any disk inactivity time threshold should be less than the exchange time interval.

Regarding claim 12, Dougkis teaches checking for an undesirable disk spin up on the previous disk access to determine whether the threshold needs to be changed [column, 10, lines 7-20].

Regarding claims 13, 14, 16, 18-20, 22 and 24, Dougkis, as described above, teaches a method for operating a disk drive in a mobile device. Therefore, Dougkis also teaches a mobile device comprising a disk drive which performs the method.

Regarding claims 25, 26, 28, 30-32, 34 and 36, Dougkis, as described above, teaches a method for operating a disk drive in a mobile device. Therefore, Dougkis also teaches a disk drive which performs the method.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bajorek et al, US Patent no. 5,452,277, teaches adaptive method for optimizing power consumption of a disk drive.

Hetzler, US Patent no. 5,682,273, teaches adaptive demand-driven power management for a disk drive in a portable computer.

Georgiou et al., US Patent no. 5,774,292, teaches a method of optimizing power consumption of a disk drive by analyzing historical access data to predict inactivity duration.

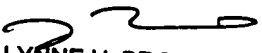
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul B Yanchus whose telephone number is (703) 305-8022. The examiner can normally be reached on Mon-Thurs 8:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne H Browne can be reached on (703) 308-1159. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Paul Yanchus
July 21, 2004


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SUPERVISORY PATENT EXAMINER
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